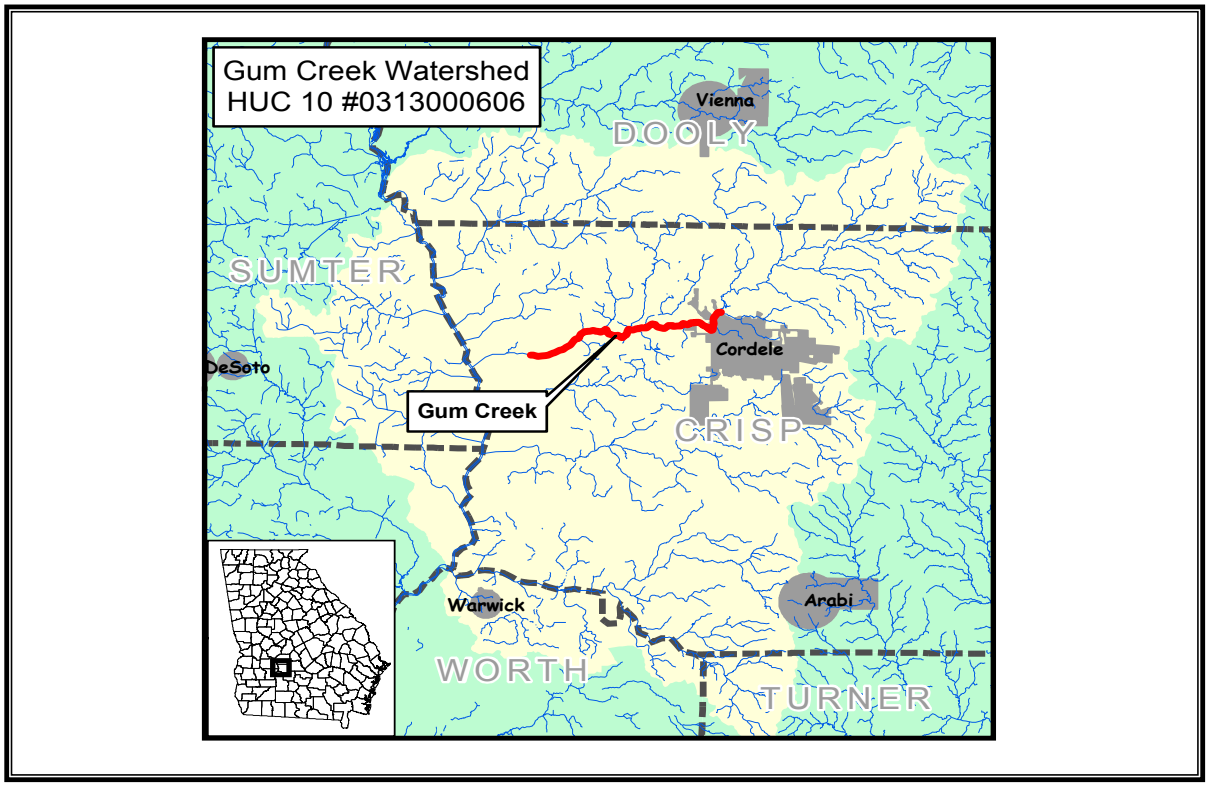
STATE OF GEORGIA

TMDL IMPLEMENTATION PLAN

GUM CREEK
(Fecal Coliform)

Prepared by
The Georgia Department of Natural Resources
Environmental Protection Division
Atlanta, GA

TMDL Implementation Plans are platforms for establishing a course of actions to restore the quality of impaired water bodies in a watershed. They are intended as a continuing process that may be revised as new conditions and information warrant. Procedures will be developed to track and evaluate the implementation of the management practices and activities identified in the plans. Once restored, appropriate management practices and activities will be continued to maintain the water bodies. The overall goal of the Plan is to define a set of actions that will help achieve water quality standards in the state of Georgia. This plan was originally prepared as an implementation inventory by the Middle Flint RDC with a Section 604(b) Grant. TMDL load allocation information has been updated to reflect the approved TMDL.



Impaired Waterbody*	Impaired Stream Location	River Basin	Miles/Area Impacted	Partially Supporting/ Not Supporting
Gum Creek	Downstream Cordele to Lake Blackshear	Flint	6	Not Supporting

STATE OF GEORGIA

TMDL IMPLEMENTATION PLAN FOR: Gum Creek (STREAM) Fecal Coliform (PARAMETER) RIVER BASIN: Flint (Middle Flint)

PLAN DATE: August 15, 2002

Prepared by Gerald Mixon Middle Flint Regional Development Center Address: 228 West Lamar Street City: Americus State: GA Zip: 31709 e-mail: gmixon@sowega.net Date Submitted to EPD:	Or Prepared By: Address: City: State: Zip: e-mail: Date Submitted to EPD:

General Information

Obtain this information from the TMDL document or other information. When completed, this document will be a self-contained report independent of the TMDL document.

Significant Stakeholders

Identify local governments, agricultural organizations or significant land holders, commercial forestry organizations, businesses and industries, and local organizations including environmental groups with a major interest in this water body.

Additional stakeholders identified on page 7

TMDL ID (to be entered by EPD)		Name/Organization	Crisp County Board of Commissioners				
Water body name	Gum Creek	Address	210 South 7th Street				
HUC basin name	Flint (Middle Flint)	City	Cordele	State	GA	Zip	31015
HUC number	03130006	Phone	229-276-2672			e-mail	
Primary county	Crisp	Name/Organization	Crisp County Health Department				
Secondary county	Dooly	Address	111 East 24th Avenue				
Primary RDC	Middle Flint	City	Cordele	State	GA	Zip	31015
Secondary RDC	-	Phone	229-276-2680			e-mail	
Water body location	Downstream Cordele to Lake	Name/Organization	Crisp County Extension Service				
	Blackshear	Address	110 West 13th Avenue				
Miles or area impacted	4 mile impaired segment	City	Cordele	State	GA	Zip	31015
Parameter addressed in plan	Fecal coliform	Phone	229-276-2612			e-mail	
Water use classification	fishing	Name/Organization	Crisp County Power Commission				
Degree of impairment	Partially supporting use	Address	P. O. Box 1218				
	Not supporting use X	City	Cordele	State	GA	Zip	31015
Date TMDL approved by EPA	April 30, 2002	Phone	229-273-3811			e-mail	
Impairment due to	Point sources	Name/Organization	Natural Resource Conservation Service				
	Nonpoint sources X	Address	110 West 13th Avenue				
	Both	City	Cordele	State	GA	Zip	31015
Point source-Form A; Nonpoint source-Form B; Both-Form A+B+C		Phone	229-273-4148			e-mail	

SUMMARY OF ALLOCATION MODEL RESULTS FROM TMDL DOCUMENT (existing load, target TMDL, and needed reduction)

EXISTING LOAD	TARGET TMDL	NEEDED REDUCTION
2.83E+12	1.5E+12	47%

I. IDENTIFY NONPOINT SOURCE CATEGORIES AND SUBCATEGORIES OR INDIVIDUAL SOURCES WHICH MUST BE CONTROLLED TO IMPLEMENT LOAD ALLOCATIONS:

List major nonpoint sources contributing to impairment including those identified in TMDL document.

SOURCE	DESCRIPTION OF CONTRIBUTION TO IMPAIRMENT	RECOMMENDED LOAD REDUCTION (FROM TMDL)
Although the draft Gum Creek TMDL identified typical nonpoint sources of fecal coliform bacteria, the specific contributor(s) of excessive fecal bacteria were not identified. In the absence of more extensive water sampling it is not yet possible to definitively identify which sources need specific attention and reduction. Based on general information collected during the development of this implementation plan, the following sources are considered to be deserving of attention.		
Residential Subdivision(s)	Combination of aging systems and small lots may be resulting in inadequately treated household sewage	Stream segment recommendation – 47%
Septic tank service	Illegal disposal of raw sewage pumped from septic tanks directly into surface waters	Stream segment recommendation – 47%

II. DESCRIBE ANY REGULATORY OR VOLUNTARY ACTIONS INCLUDING MANAGEMENT MEASURES OR OTHER CONTROLS BY GOVERNMENTS OR INDIVIDUALS THAT WILL HELP ACHIEVE THE LOAD ALLOCATIONS IN THE TMDL:

Existing or required regulatory actions

RESPONSIBLE GOVERNMENT, ORGANIZATION OR ENTITY	NAME OF REGULATION/ORDINANCE	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Crisp County Health Department	State rules and regs. for on-site sewage mgt. sys.	Regulates installation1and repair of septic systems	01-98	active
Crisp County Planning Department	Wetland protection ordinance	Regulates development in wetlands	1999	active
GA EPD	Concentrated Animal Feeding Operations	Enforcement of wastewater treatment regulations applicable to feedlot operations	09-74	enforced as needed

Existing voluntary actions

RESPONSIBLE ORGANIZATION OR ENTITY	NAME OF ACTION	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Ag producers	Best Management Practices	Maximizing production without causing deleterious effects to other resources	1990s	active
Landowners and hunters	Wild game hunting	Hunting wildlife for recreational purposes	N/A	active
Soil and Water Conservation District	Promote voluntary adoption of agricultural Best Management Practices	Provide leadership in protection, conservation, and improvement of soil, water and related resources.	1937	active
USDA National Resources Conservation Service (NRCS)	Environmental Quality Incentives Program and other T/A	Develop standards and specifications regarding conservation practices, animal waste management systems, grazing activities, et al. – implements state priorities	1997	active; needs additional funding
Cooperative Extension Service and Experiment Stations	Disseminate information	Consulting assistance, information on nonpoint-related impacts on water quality, water quality monitoring analysis of nutrients and other constituents in animal waste, nutrient management plans.	1914	active
Farm Service Agency (FSA)	Water quality improvement practices (Conservation Reserve Program)	Administration of cost-sharing and incentive programs for practices that improve environmental quality of farms. Funds targeted for high-priority watersheds with water quality problems.	1985	active
Georgia Department of Agriculture	Disease control	Provides guidance in location of animal waste facilities and disposal of dead animals.	1874	As needed
USDA Agricultural Research Service (ARS)	Agriculture research and monitoring	Research on grazing land systems and irrigation methods relevant to watershed-scale monitoring projects and nutrient movement in surface water and groundwater.		As needed
Resource Conservation and Development Council	Volunteer activism	Citizen activism in conservation of natural resources	1962	As needed
Poultry Federation	Nutrient Management Plans	Matching nutrient value of poultry waste with soil amendment needs of farmland	06-00	active
Lake Blackshear Watershed Assn	Scientific studies	Addressing water quality in Lake Blackshear	01-86	active

Additional recommended regulatory or other measures which should be implemented to reduce the loads of the TMDL parameter

ENTITY/ORGANIZATION RESPONSIBLE	NAME OF PROPOSED REGULATION/ORDINANCE/ OTHER	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
GA DNR	Wildlife Survey	Survey of the impaired creek segment to determine whether wildlife are present in numbers sufficient to be major contributors to any unsafe fecal coliform levels	Year 1	pending plan approval and funding
GA DNR	Hunter education	Educate hunters of the environmental harm of disposing wild game entrails in waterways	Year 1-5	pending plan approval and funding
Crisp County Board of Commissioners	Septic tank service permit	Impose permitting procedure to document proper disposal of raw sewage removed from septic systems	Year 2	under consideration
Lake Blackshear Watershed Association	Strategic collection of additional water samples	Additional testing to, (1) confirm presence of excessive fecal coliform bacteria, and (2) help locate source(s) of origin	Year 2	pending plan approval and funding
Crisp County Board of Commissioners	Provide public wastewater treatment to Omar Heights and Meadow Park Subdivisions	Eliminate use of individual septic systems in densely developed areas with a history of septic failure	Year 4-5	pending plan approval and funding
Cooperative Extension; Natural Resources Conservation Service	Inventory level of compliance with agriculture BMPs	Determine level of agriculture BMP compliance among Gum Creek Watershed Project participants	Year 4-5	as needed and pending funding
City of Cordele	Storm water treatment	Management/treatment of urban runoff	unknown	pending federal regs.

III. SCHEDULE FOR IMPLEMENTING MANAGEMENT MEASURES OR OTHER CONTROL ACTIONS:

These must be implemented within five years of when the implementation plan is accepted by EPA.

IMPLEMENTATION ACTION		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Form stakeholders group		X				
Organize implementation work with stakeholders and local officials to identify remedial measures and potential funding sources		X	X			
Identify sources of TMDL parameter			X	X		
Develop management programs to control runoff including identification and implementation of BMPs (Phase I):	Agriculture	N/A				
	Forestry	N/A				
(permit servicing of septic systems)	Urban		X	X	X	
	Mining	N/A				
Organize and implement education and outreach programs			X	X		
Detect and eliminate illicit discharges			X	X	X	
Evaluate additional management controls needed				X	X	
Monitor and evaluate results				X	X	
Reassess TMDL allocations					X	
Provide periodic status reports on implementation of remedial activities					X	X
If needed, begin process for Phase II (next 5 years) and subsequent phases						X

IV. PROJECTED ATTAINMENT DATE AND BASIS FOR THAT PROJECTION:

The projected attainment date is 10 years from acceptance of the implementation plan by EPA.

V. MEASURABLE MILESTONES:

- Number of management controls and activities already implemented 14

- Number of management controls and activities proposed in five-year work program 6

- Number of management controls and activities actually implemented in five-year work period to be completed in five years

- Stream sampled to identify areas of concern See monitoring plan

- Other _____ _____

- Other _____ _____

VI. MONITORING PLAN:

Describe previous or current sampling activities or other surveys to detect sources or to measure effectiveness of management measures or other controls.

ORGANIZATION	TIME FRAME	PARAMETERS	PURPOSE	STATUS
GA EPD	2-10/02	Fecal Coliform	TMDL development	complete
Lake Blackshear Watershed Association (Gum Creek Nutrient Study)	1987	Nutrients and Pollutants	Measure nutrient and pollutant inputs to Gum Creek sub-watershed and relate these to land use patterns	complete

Describe any planned or proposed sampling activities or other surveys.

ORGANIZATION	TIME FRAME	PARAMETERS	PURPOSE	STATUS
Lake Blackshear Watershed Association	2003	Fecal Coliform	Strategic water sampling to help identify location of origin	pending funding
Cooperative Extension Service, Natural Resources Conservation Service	2003	Fecal Coliform	Survey to determine level of compliance with fecal relevant aspects of Gum Creek Water Quality Project '91-'99	as needed, pending results of strategic sampling
EPD	2005	Fecal Coliform	River basin planning	scheduled

VII. CRITERIA TO DETERMINE WHETHER SUBSTANTIAL PROGRESS IS BEING MADE:

- % concentration or load change
  47% load reduction

- Categorical change in classification of the stream (delisting the stream is the goal)
  Delisting is the goal of this plan

- Regulatory controls or activities installed
  Six are proposed
- Best management practices installed
  Pending results of additional testing, inventory of BMP compliance, as needed, is proposed

COMMENTS

_____

_____

_____

Additional stakeholders from page 1

C. L. Williams
Gloria G. Slade
Bill Overstreet
Louis D. & Larry M. Perlis
Griffin Lumber Company
Annette M. Wade
Harold McKay
G. Wylie Sheppard
Ms. Jean H. Burnette
C. Monroe Hunt
Harry F. Carter
State Fish Hatchery
S. F. Clements
Dennis T & Jennifert T. Phillips
Carolyn Albritton Howard
Michael D. & Kim L. Arnett
John W. Floyd
Hale M. & Jacquelyn Crim
W. Lawton & Betty Sammons
Daniel & Denise Athon
William Douglas & Ratrisha Rainey
Roman Musselwhite
Stephens Brs. Develop. Corp.
James Farrow Baker
Mr. Russell Toning
Ms. Susan Reyher
Phil Porter and Robbie Hughes
Mr. Morris Cook
Dr. Elisabeth Elder
Mr. Don Williford

Gum Creek TMDL Implementation Plan
Flint River (Middle Flint) Basin - HUC #03130006
Crisp County, Georgia

Background

The State of Georgia assesses public waters for compliance with water quality standards as required by the Federal Clean Water Act (CWA) enacted in 1972. Based on the water quality assessment performed on Gum Creek in 2000/2001, the waterway has been classified as not supporting the creek=s designated use of fishing. Consequently, a six mile segment of Gum Creek has been placed on Georgia=s 305(b) list as required by that section of the CWA which addresses the water quality assessment process, and Georgia=s 303(d) list, also named after an applicable section of the CWA.

Gum Creek was placed on the 303(d) list because the water quality assessment performed revealed fecal coliform bacteria counts in excess of water quality standards. Fecal coliform bacteria are simple, single-celled organisms found in the digestive systems of warm-blooded animals, and also occur naturally in the soil.

Water bodies on the 303(d) list are required to have a Total Maximum Daily Load (TMDL) evaluation for the water quality constituent(s) found to be in violation of water quality standards. A TMDL is the calculation of the maximum amount (loading) of a pollutant that a river, stream or lake can receive and still be safe and healthy. The TMDL process allows water quality-based controls to be developed to reduce pollution and to restore and maintain water quality at safe and healthy levels. Georgia EPD released the draft TMDL on June 30, 2002.

Environmental Parameter

Fecal coliform bacteria are indicators of a potential public health risk, and not an actual cause of disease. They have been traditionally used by public health authorities to indicate health risk from a wide range of living organisms too small to see with the naked eye (microbes), and to set water quality standards for drinking water, shellfish consumption and water contact recreation.

Fecal coliform bacteria suggest the co-presence of bacterial pathogens (disease-causing microbes) which can cause dysentery, gastrointestinal illness, cholera, typhoid fever and Astaph@ infections. The actual risk of contracting a disease from a pathogen depends on a host of factors, such as the method of exposure or transmission, pathogen concentration, incubation period and the age and health status of the infected party.

Fecal coliforms are an imperfect indicator of water safety, and regulators continually debate whether other bacterial species are better indicators of potential health problems. The debate remains largely academic; however, as over 90% of states still rely on fecal coliform, in whole or in part, as their recreational water quality standard.[1]

[1] Watershed Protection Techniques, vol. 3, no. 1, April, 1999

Sixteen water samples were collected at the U. S. Highway 280 bridge between February and October, 2000, and used in the water quality assessment. This location is only 4,000 feet upstream of the creek=s discharge point at Lake Blackshear. As a result of the analysis of the samples collected, and utilization of computer modeling techniques to estimate the impact of various land uses on fecal loading, the six mile segment of Gum Creek extending upstream from the lake was classified as the impaired segment. Only the land use in this lowest sub-watershed (-05) was used in the modeling effort because bacteria Aconcentrations are believed to be most strongly associated with local inputs.@[2] Consequently, this implementation plan primarily addresses the lowest of the three sub-watersheds.

Watershed Description

The Gum Creek watershed (twelve digit HUCs # 031300060603, -04 and -05) is located in north-central Crisp County, and south-central Dooly County, between the Cities of Cordele and Vienna. The 53,500 acre watershed ranges in elevation from 450 feet mean sea level on the eastern extremity, to 240 feet mean sea level at the creek=s discharge site, Lake Blackshear. The greatest dimensions are approximately eight miles north-south by fifteen miles east-west. The watershed has not experienced significant population or development increase in the two years since the water samples used for water quality assessment and TMDL development were collected.

Located in the Coastal Plains geologic province, the two primary soil classifications are (1) Tifton-Dothan-Rains; nearly level or very gently sloping soils that have sandy surface and subsurface layers and loamy underlying layers, on uplands; and nearly level soils that have sandy surface and subsurface layers and loamy underlying layers in depressions and along drainage ways, and (2) Tifton-Alapaha-Dothan; nearly level to gently sloping soils that have a sandy surface and subsurface layers and loamy underlying layers on uplands; and nearly level soils that have a sandy surface layer, thick sandy subsurface layer, and loamy underlying layers in depressions and along drainage ways.

Source Assessment

There are two broad sources of pollution; point and nonpoint. A point source is defined as a discernable, confined, and discrete point or site from which pollutants are discharged into surface waters. Examples of point sources are municipal and industrial wastewater treatment plants. These sources have been addressed through the Clean Water Act=s National Pollutant Discharge Elimination System (NPDES) permit program.

The City of Cordele water pollution control plant is the only NPDES regulated facility discharging wastewater (which includes fecal coliform) into Gum Creek. Because this point source is closely regulated by the NPDES permitting program and has recorded no permit

[2] Gum Creek TMDL, page C-6

violations in recent years, it is not here considered a possible source of the elevated fecal counts reported in Gum Creek.

The second broad category of pollution is nonpoint sources, the focus of this implementation plan. These are diffuse and generally involve accumulation of fecal coliform bacteria on land surfaces that wash off as a result of rain events. In general, nonpoint sources cannot be identified as discharging wastewater into a water body at a single location. Typical nonpoint sources of fecal coliform bacteria include:

Wildlife	Agricultural Livestock	Urban Development
	Animal grazing and confinement	Leaking septic systems
	Animal access to streams	Land application systems
	Use of manure on crop/pasture	Landfills
		Storm sewers

Wildlife

The importance of wildlife as a source of fecal coliform bacteria in streams varies considerably, depending on the animal species present in the watershed. Animals that spend a large portion of their time in or around aquatic habitats are considered to be the most significant wildlife contributors of fecal coliform bacteria. Waterfowl, most notably ducks and geese, are considered the potentially greatest contributors of fecal coliform because they are typically found on the water surface, often in large numbers, and deposit their feces directly into the water.

Waterfowl, especially wood ducks, have recorded an increasing presence along Gum Creek in recent years. Because of their very high bacteria excretion rates and the fact that they seldom venture far from preferred habitat, riparian corridors and similar areas with cover, preliminary information suggests waterfowl may be present in sufficient numbers to be a significant contributor.

White-tailed deer also have a significant presence. Based on the 2000 deer census of Crisp and Dooly Counties, there are believed to be approximately 3,000 deer distributed throughout the Gum Creek watershed (and approximately 1,000 in the lowest sub-watershed). Although deer are generally considered to be one of the less significant contributors of fecal coliform bacteria, the feces they deposit on the land surface can result in the introduction of fecal coliform to streams during runoff (rain) events. It should be noted that between rain events considerable decomposition of the fecal matter might occur, resulting in a decrease in the associated fecal coliform numbers. This also holds true for other terrestrial mammals such as squirrel, rabbit and terrestrial birds.

A feral hog population of unknown size has been reported in the middle sub-watershed (-04), a short distance upstream of the lower sub-watershed. Feral hogs are adaptable to almost any habitat, but prefer wooded areas close to water. Lacking sweat glands they regulate body temperature by laying in water or mud and cannot survive in hot climates without a plentiful supply of water. Areas elsewhere with significant feral hog populations have recorded high concentrations of fecal coliform bacteria.

Their ability to thrive on a very diverse diet gives them a distinct survival advantage over other species. Because they are so prolific, adaptable, tenacious, and have no natural predators, it is difficult to control their population.

Agricultural Livestock

Agricultural livestock are potential sources of fecal coliform bacteria whether on open pasture or in confinement. Cattle, sheep, horses, and goats grazing on pasture deposit feces onto land surfaces from where it can be transported to nearby streams during rain events. Livestock on open grazing also often have direct access to streams that pass through pastures, and as such can impact water quality in a more direct manner. Confined animal feeding operations (CAFO), such as beef cattle in feedlots, poultry houses and confined dairy cattle and swine, generate large quantities of fecal material within a limited area with potential for significant bacterial runoff.

The approximately 4,000 cows and calves in Crisp County's 2000 livestock inventory[3] were in numerous small herds on pastures distributed throughout the county. Very few of these were within the Gum Creek watershed; however, as this area (of Crisp and Dooly Counties) has never been significant in the production of cattle. There were not any beef cattle CAFOs in the watershed.

Although a few sheep, horses or goats may have been raised in the watershed during 2000 as a hobby, no such livestock are known to have been present. The 2000 livestock census placed the two-county aggregate for all three kinds of livestock at less than 900.[4]

There were reportedly 4,500 swine (3,500 in Crisp) in the two counties in 2000.[5] Hereagain, very few, if any, are believed to have been in any of the three Gum Creek sub-watersheds, especially the lowest of the three. The vast majority was raised on a single site in confinement in the southern half of Crisp County.

Agricultural census data reveal approximately 7.5 million broilers were raised in the two counties in 2000.[6] None of these poultry houses were located in the Gum Creek watershed, precluding fecal runoff from poultry production sites. Although litter from poultry houses located elsewhere is not known to have been transported into the watershed for distribution on farmland acreage, some could have been applied.

Poultry litter is a soil enhancer that must be incorporated soon after application to realize maximum benefit. It was during the time the Gum Creek samples were collected that the poultry industry started promoting the use of nutrient management planing, matching nutritional value of

3 Georgia County Guide, 2001

4 Gum Creek TMDL document

5 Georgia Guide, 2001

6 Gum Creek TMDL document

poultry litter with the nutritional needs of any given application site. This refinement to an existing best management practice further reduces the potential for bacterial runoff.

Urban Development

For TMDL purposes, septic tanks are considered an "urban" development. After solids are trapped in a septic tank, wastewater is distributed through a subsurface drain field and allowed to percolate through the soil. If the septic system is properly located, installed and maintained, bacteria are effectively removed by filtering and straining water thorough the soil profile. A large number of septic systems fail; however, when wastewater breaks out or passes through the soil profile without adequate treatment.

The causes of septic system failure are numerous; inadequate soils, poor design, siting, testing or inspection, hydraulic overloading, tree growth in the drain field, old age, and failure to clean out. Among the factors officials should consider when investigating whether septic systems are likely to be a major bacteria source are age (systems older than twenty years) and small lots. The design life of most septic systems is 15-30 years, at which point major rehabilitation or replacement is often needed.

There may be as many as 300 septic tanks in the lower sub-watershed currently in use. The preponderant soil type throughout this area is Tifton, classified as having "moderate" limitations for use as septic tank absorption fields. The "moderate" classification means any given site may require some degree of special planning, design, or maintenance to overcome or minimize the slow percolation rate generally characteristic of Tifton soils. In large part because of the sparse level of development throughout the sub-watershed, the Crisp County Health Department reports no significant problem with septic tank operations. However, there is at least one notable exception.

There is a history of septic system failures in Omar Heights, a residential subdivision developed in the late 1940s/early 1950s. Developed on relatively small lots and very level Tifton soil, topography divides the subdivision into two Gum Creek sub-watersheds. Of the ±80 lots, approximately half are located in the lower sub-watershed -05, and the other (eastern) half in sub-watershed -04. Age, density of development, flat topography and relatively small lots collectively create septic problems throughout much of the subdivision. The health department has denied permits for some needed septic repairs because the improved system would not meet current health department standards.

Natural hydrologic flow from the eastern half of Omar Heights (-04) is eastward, toward another residential subdivision with very similar characteristics and features, and septic problems. Meadow Park is only 2,000 feet southeast of Omar Heights. Gum Creek flows along the eastern boundary of this subdivision, and enters the lower sub-watershed (-05) 2,000 feet downstream.

Near the other end of sub-watershed -05 is Willow Lake, a subdivision of approximately 30 lots. According to the soil survey conditions at this site are very favorable for septic tank absorption fields. A health department official states the age of the park is such that failing septic systems can be expected. However, because tanks and drain fields were installed so much deeper than

current regulations allow, signs of malfunctioning systems might not be detectable. Consequently, bacteria may be passing through the soil profile without adequate treatment. A ±10 acre pond lies adjacent to the east side of the subdivision, ±20 feet below the subdivision's sloping elevation. Water flows from this pond beneath U.S. 280 where it promptly merges with Gum Creek.

Land Application Systems

Many smaller communities use land application systems (LAS) for treatment of their sanitary wastewaters. These facilities are required through LAS permits to treat all their wastewater by land application and to have zero discharge. However, runoff during rain events may carry surface residual containing fecal coliform bacteria to nearby streams. Some of these facilities may also exceed the ground percolation rate when applying the wastewater, resulting in surface runoff from the field. If not properly bermed, this runoff, which likely contains fecal coliform bacteria, may discharge to nearby surface waters. No land application system has operated or is operating in the Gum Creek watershed.

Landfills

Leachate from landfills may contain fecal coliform bacteria and may at some point discharge into surface waters. Sanitary (municipal) landfills are the most likely type of landfills to serve as a source of fecal coliform bacteria. These receive household wastes, animal manure, offal, hatchery and poultry processing plant wastes, dead animals, and other types of wastes. Older sanitary landfills were not lined and have closed. Those that remain active and have not been lined operate as construction/demolition landfills. Currently active sanitary landfills are lined and have leachate collection systems. All landfills, except inert landfills, are now required to install environmental monitoring systems for groundwater sampling and methane. There is no record of any landfill, sanitary or construction and demolition, operating in the Gum Creek watershed in either Crisp or Dooly Counties.

Storm Sewers

The City of Cordele collects a significant portion of storm water flow (runoff) via a storm sewer system, and discharges it through distinct outlet structures into creeks and streams. Documented sources of nonhuman fecal coliform in urban watersheds include dogs, cats, raccoons, rats, beaver, geese and pigeons. Dogs in particular appear to be a major source of coliform bacteria and other microbes because of their population density, daily defecation rate, and pathogen infection rates.

For urban areas of 100,000 population and larger, storm water discharges are regulated under a storm water permitting program. Storm water discharge outlets of smaller urban areas are currently not regulated. However, Cordele is currently on a list of communities which, depending on final federal criteria, may have to implement storm water management or treatment regulations.

Gum Creek Water Quality History

Lake Blackshear was classified as eutrophic in a 1974 EPA survey of Georgia lakes. During the period 1974 through 1993 the lake was ranked among the top 8 lakes in the state for eutrophic state index values. In two of these years Lake Blackshear had the highest readings of any tested lake in the state. The Georgia EPD report *Water Quality in Georgia*, 1992-1993 listed the lake in the Anot support@ category for recreational use because of fecal coliform and heavy metals. The report indicated that potential sources of the contaminants were municipal and agricultural non-point sources.

Gum Creek was identified in the December 1989 *Georgia Nonpoint Source Assessment Report* and the *Georgia Non-point Source Management Plan* as an agricultural stream likely to be threatened by agricultural non-point sources of pollution. A study sponsored by the Buckeye Cellulose Corporation in 1984 reported that nutrient loading was sufficient to classify Gum Creek as eutrophic. A subsequent study, conducted in 1989 by Cofer, et al., for the Lake Blackshear Watershed Association, concluded that control of agricultural release of phosphorous and nitrogen is important in the watershed.

The Gum Creek Water Quality Project (1991-1999) was implemented to address the environmental issues raised in the above referenced research. The main objective of the project was to secure farmer participation in cost-shared best management practices (BMP) designed to reduce pollution and/or the potential of pollution of surface and ground waters in the project area while maintaining farmer productivity and profitability. Other objectives included: increasing landowner knowledge and understanding of agricultural pollution potentials and water quality, increasing crop production efficiency through better management of natural resources, increasing awareness of the general public of surface and groundwater contamination and to initiate a state-administered cost-share program for agricultural BMPs.

Among the many BMPs promoted, the ones most relevant to the current effort are:

> Permanent structures designed to reduce surface water contamination by acting as nutrient or pesticide sinks and settling areas for sediments.
>
> Permanent structures designed to act as physical barriers to prevent contamination of soil, groundwater or surface water from pesticides and/or nutrients.
>
> Permanent structures designed to reduce sediment, pesticide and nutrient loading of surface water by run-off management.
>
> Permanent structures designed to prevent access of cattle to streams thus reducing nutrient loading from waste products and sedimentation caused by bank erosion.

The project was very successful. Cost-share contracts were written with 31 farmers on 12,000 acres in the project area, representing 98% of all full-time farmers and 48% of all cropland in the watershed. Nineteen of 23 BMPs were initiated. Annual enrollment figures on the most widely adopted practices were as follows: 7980 acres in Integrated Crop Management, 7,129 acres in crop residue management, 4,168 acres in irrigation water management, 2579 acres in conservation tillage, 1,224 acres in green manure cover crop. Permanent structure installation highlights were as follows: 3 water holding facilities (ponds), 150 wellheads curbed, repaired or upgraded, 13 portable chemical mixing stations, 1 permanent chemical mixing/loading/storage facility, 7,938 feet of livestock fencing, 1 alternative livestock water source, 1 alternative livestock water supply, and 10 miles of terraces.

Perhaps the greatest lesson learned from the project is that profitable South Georgia agricultural enterprises can co-exist with a healthy environment through the use of agricultural best management practices. BMPs can be highly effective in reducing pesticide and nutrient contamination of both surface and groundwater. Farmers are willing to install and implement economically and environmentally sound BMPs.

Implementation Plan Stakeholder Involvement

Owners of land contiguous to the impaired segment of Gum Creek were identified from courthouse tax records. Local government officials, Farm Bureau officers and agricultural experts from the County Extension Office and National Resources and Conservation Service were also identified. Thirty-five invitations were mailed; fifteen people attended the two hour meeting held August 1, 2002, at Georgia Veterans Memorial State Park on Lake Blackshear.

Discussion at the stakeholder meeting included all of the above referenced topics, as well as one illegal activity. There were reports of raw sewage from sewage vacuum trucks being unloaded directly into creeks in the county; though there were no specific references to such occurrences in Gum Creek or its watershed. From their input and supporting documentation the accompanying water sample/monitoring plan was developed.

Potential Funding Sources

Watershed Assistance Grants
Nonpoint Source Implementation Grants (319)
Water Quality Cooperative Agreements
Lake Blackshear Watershed Association
Georgia EPD

Gum Creek
Water Sampling Plan
(see accompanying map)

Because of the number of potential contributors of fecal coliform bacteria within the watershed, additional testing is needed to help identify the general location of primary source(s) and any appropriate corrective actions that may be needed. Additional water sample collections are proposed for the following sites:

Collection site 1	located on the upstream side of U. S. 41 at Gum Creek, 2,000 feet downstream of Meadow Park subdivision, an urban site experiencing significant septic problems. This collection site also receives storm flow from the east half of Omar Heights.
collection site 2	located on the upstream side of Drayton Road at an unnamed creek approximately 1.25 miles west of U. S. 41. This site is 4,000 feet from Omar Heights, a subdivision experiencing septic problems for several years related to soil conditions and undersized lots. This site receives runoff from the western half of the subdivision.
collection site 3	located at the dam site of the former ±60-acre Williams Lake (drained), 2.5 miles below collection site 1. This site will serve as a control for assessing the impact of waterfowl inhabiting the wetland area immediately downstream.
Collection site 4	approximately 3.5 miles downstream of site 3, this site will help measure the impact of waterfowl inhabiting the area. The collection site is located near the western intersection of land lots 105 and 106. It will be accessed via private lands with entry gained from U. S. 280 at land lots 89 or 121.
Collection site 5	located approximately 1.75 miles below site 4, this site is on the upstream side of the U.S. 280 bridge, apparent site of the samples collected by the Environmental Protection Division of DNR in 2000.
collection site 6	also located on the upstream side of U.S. Highway 280 bridge, this site is immediately downstream of a Willow Lake, a ±30 unit residential subdivision. This flow merges with Gum Creek on the downstream side of the bridge.
Collection site 7	located approximately 4,000 feet below site 6, this is the Gum Creek discharge site into Lake Blackshear. This site is a wetland area inhabited by various species of wildlife.

GUM CREEK
TMDL IMPLEMENTATION PLAN
WATER SAMPLE COLLECTION SITES